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Amended Claims

JUN 28 2004

Please replace the pending claims with those listed below, which supercede and replace any previously listed claims.

OFFICIAL

1. (Currently Amended) Apparatus for configuring a control system, the apparatus comprising:

a plurality of objects, each of which represents an entity,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and being associated with one or more parameters of the ancestor object,

a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated without recompilation of those objects.

2. (Original) Apparatus according to claim 1, including an editor that facilitates definition, during configuration, of an association between an parameter and an object.

3. (Original) Apparatus according to claim 2, including functionality that facilitates definition, during configuration, of an object as a descendant of another object.

4. (Original) Apparatus according to claim 2, wherein each parameter has one or more attributes, and wherein the apparatus has an editor that facilitates definition, during configuration, of a value of an attribute.

5. (Original) Apparatus according to claim 1, wherein an object represents an entity within any of (i) a controlled system, (ii) the control system, (iii) a control level hierarchy, and (iv) the apparatus for configuring the control system.

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6. (Original) Apparatus according to claim 5, wherein an entity includes any of a field device, control processor, block, loop, compound, historian, object type category, object connection, parameter connection, display placeholder, graphical display entity, and report.
7. (Original) Apparatus according to claim 1, wherein each parameter has one or more attributes, and wherein the attributes of a parameter define any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
8. (Currently Amended) Apparatus according to claim 1, wherein a change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated, regardless of whether that change is made before or after the descendant is any of defined and created, and wherein that change is effective without recompilation of those objects.
9. (Currently Amended) Apparatus for configuring a control system, the apparatus comprising:
 - a plurality of objects,
 - each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,
 - at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and as being associated with the parameters of the ancestor object,
 - a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated, without recompilation of those objects.
10. (Original) Apparatus according to claim 9, wherein a descendant object is associated with the parameters of the ancestor object from which it descends, and is associated with further parameters as consequence one or more parameters definitions contained in, or associated with, the descendant object.
11. (Currently Amended) Apparatus for configuring a control system, the apparatus comprising:

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a plurality of objects, each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object, wherein an object represents an entity within any of (i) a controlled system, (ii) the control system, (iii) a control level hierarchy, and (iv) the apparatus for configuring the control system,

at least one object being associated with a parameter as a consequence of any of a parameter definition, parameter override and parameter modification contained or associated with the object,

at least one object being a descendant of another object ("ancestor" object) and being associated with one or more parameters with which the ancestor object is associated such that change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated without recompilation of those objects,

a parameter with which an object is associated as a consequence of any of a parameter definition, parameter override and parameter modification takes precedence over a parameter with which an object is associated as a consequence of being defined as a descendant of another object.

12. (Original) Apparatus according to claim 11, wherein a change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated, except insofar as that parameter is associated with the descendant object as a consequence of any of a parameter definition, parameter override and parameter modification.

13. (Original) Apparatus according to claim 12, comprising

a second object that is defined as a descendant of a first object, and

a third object defined as a descendant of the second object.

14. (Original) Apparatus according to claim 13, wherein a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification takes precedence as to the second and third objects over a corresponding parameter associated with the first object.

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15. (Original) Apparatus accord to claim 13, wherein a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification is associated with the third object as a consequence of descendancy, regardless of whether a corresponding parameter is associated with the first object.
16. (Original) Apparatus according to claim 11, wherein at least one object ("modified" object) is associated with another object ("modifier" object) for purposes of parameter modification, and wherein the modified object associated with one or more parameters of the modifier object.
17. (Original) Apparatus according to any of claims 9 and 11, wherein an entity includes any of a field device, control processor, block, loop, compound, historian, object type category, object connection, parameter connection, display placeholder, graphical display entity, and report.
18. (Original) Apparatus according to claim 17, wherein each parameter has one or more attributes defining any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
19. (Original) Apparatus for configuring a control system, the apparatus comprising:
 - a plurality of objects,
 - each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,
 - at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and as being associated with one or more parameters of the ancestor object, a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated,
 - at least one object being associated with one or more parameter groups, each of which defines a grouping for one or more parameters associated with that object.

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20. (Original) Apparatus according to claim 19, wherein a parameter group defines a grouping with which one or more parameters are presented for any of editing and reporting.
21. (Original) Apparatus according to claim 20, wherein, as a consequence of descendancy, a descendant object is associated with the parameter groups of the ancestor object from which it descends.
22. (Original) A method for configuring a control system, the method comprising the steps of:

representing entities with objects, each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object.
23. (Original) A method according to claim 22, including the step of defining, during configuration, an association between an parameter and an object.
24. (Original) A method according to claim 23, including the step of defining, during configuration, an object as a descendant of another object.
25. (Original) A method according to claim 23, wherein each parameter has one or more attributes, and wherein the method includes the step of defining, during configuration, a value of an attribute.
26. (Original) A method according to claim 22, wherein an object represents an entity within any of (i) a controlled system, (ii) the control system, (iii) a control level hierarchy, and (iv) the apparatus for configuring the control system.
27. (Original) A method according to claim 26, wherein an entity includes any of a field device, control processor, block, loop, compound, historian, object type category, object connection, parameter connection, display placeholder, graphical display entity, and report.

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28. (Original) A method according to claim 22, wherein each parameter has one or more attributes, and wherein the attributes of a parameter define any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
29. (Original) A method according to claim 22, including the step of making effective as to a descendant object a change, during configuration, to a parameter of the ancestor object from which the descendant object descends, regardless of whether that change is made before or after the descendant is any of defined and created.
30. (Original) A method for configuring a control system, the method comprising the steps of:

representing entities with objects, each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,

defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object),

associating a descendant object with the parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object.
31. (Original) A method according to claim 30, comprising the step of associating a descendant object with parameters in addition to those of the ancestor object from which it descends.
32. (Original) A method for configuring a control system, the method comprising the steps of:

representing entities with a plurality of objects,

associating each object with one or more parameters as a consequence of any of a parameter definition, parameter override and parameter modification contained or associated with the object,

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each parameter pertaining to a characteristic of an entity represented by the object, wherein an entity models an entity within any of (i) a controlled system, (ii) the control system, (iii) a control level hierarchy, and (iv) the apparatus for configuring the control system,

defining at least one object as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters with which the ancestor object is associated, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object, except as to a parameter with which the descendant object is associated as a consequence of any of a parameter definition, parameter override and parameter modification.

33. (Original) A method according to claim 32, comprising the steps of

defining a second object as a descendant of a first object, and

defining a third object as a descendant of the second object.

34. (Original) A method according to claim 33, comprising the step of associating the second and third objects with one or more parameters of the first object, except as to a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification.

35. (Original) A method accord to claim 33, associating the third object with a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification, regardless of whether a corresponding parameter is associated with the first object.

36. (Original) A method according to claim 32, comprising the steps of

defining at least one object ("modified" object) as being associated with another object ("modifier" object) for purposes of parameter modification,

associating a modified object with one or more parameters of the associated modifier object, and making effective as to that modified object a change, during configuration, to a parameter of that modifier object.

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37. (Original) A method according to any of claims 30 and 33, wherein an entity includes any of a field device, control processor, block, loop, compound, historian, object type category, object connection, parameter connection, display placeholder, graphical display entity, and report.
38. (Original) A method according to claim 37, wherein each parameter has one or more attributes defining any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
39. (Currently Amended) A method for configuring a control system, the method comprising the steps of:
- representing entities with objects, each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,
- defining at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object),
- associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object without recompilation of those objects,
- associating at least one object with one or more parameter groups, each of which defines a grouping for one or more parameters associated with that object.
40. (Original) A method according to claim 39, comprising the step of presenting one or more parameters of an object during any of editing and reporting as a function of a parameter group associated with that object.
41. (Original) A method according to claim 39, comprising associating a descendant object with the ancestor object from which that descendant object descends.

Claim 42 (cancelled).

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43. (Currently Amended) A method for configuring a control system, the method comprising the steps of:

representing entities with objects, each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object without recompilation of those objects,

configuring the control system in accord with one or more of the objects.

44. (Currently Amended) Apparatus for configuring a process control system, the apparatus comprising:

a plurality of objects, each of which represents an entity selected from the group of entities including a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and being associated with one or more parameters of the ancestor object,

a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated without recompilation of those objects.

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45. (Original) Apparatus according to claim 44, wherein each parameter has one or more attributes, and wherein the attributes of a parameter define any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.

46. (Currently Amended) Apparatus for configuring a process control system, the apparatus comprising:

a plurality of objects, each of which represents an entity selected from the group of entities including a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,

at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and as being associated with the parameters of the ancestor object,

a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated without recompilation of those objects.

47. (Original) Apparatus according to claim 46, wherein a descendant object is associated with the parameters of the ancestor object from which it descends, and is associated with further parameters as consequence one or more parameters definitions contained in, or associated with, the descendant object.

48. (Currently Amended) Apparatus for configuring a process control system, the apparatus comprising:

a plurality of objects, each of which represents an entity selected from the group of entities including a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object, wherein an object represents an entity within any of (i) the controlled process, (ii) the control system, (iii) a control level hierarchy, and (iv) the apparatus for configuring the control system,

at least one object being associated with a parameter as a consequence of any of a parameter definition, parameter override and parameter modification contained or associated with the object,

at least one object being a descendant of another object ("ancestor" object) and being associated with one or more parameters with which the ancestor object is associated such that change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated without recompilation of those objects.

a parameter with which an object is associated as a consequence of any of a parameter definition, parameter override and parameter modification takes precedence over a parameter with which an object is associated as a consequence of being defined as a descendant of another object.

49. (Original) Apparatus according to claim 48, wherein a change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated, except insofar as that parameter is associated with the descendant object as a consequence of any of a parameter definition, parameter override and parameter modification.

50. (Original) Apparatus according to claim 49, comprising

a second object that is defined as a descendant of a first object, and

a third object defined as a descendant of the second object.

51. (Original) Apparatus according to claim 50, wherein a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification takes precedence as to the second and third objects over a corresponding parameter associated with the first object.

52. (Original) Apparatus accord to claim 50, wherein a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification is associated with the third object as a consequence of descendancy, regardless of whether a corresponding parameter is associated with the first object.
53. (Original) Apparatus according to claim 48, wherein at least one object ("modified" object) is associated with another object ("modifier" object) for purposes of parameter modification, and wherein the modified object associated with one or more parameters of the modifier object.
54. (Original) Apparatus according to claim 48, wherein each parameter has one or more attributes defining any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
55. (Currently Amended) Apparatus for configuring a process control system, the apparatus comprising:
 - a plurality of objects, each of which represents an entity selected from the group of entities including a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,
 - each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,
 - at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object) and as being associated with one or more parameters of the ancestor object, a change during configuration to a parameter of an ancestor object being effective as to a descendant object with which that parameter is associated without recompilation of those objects,
 - at least one object being associated with one or more parameter groups, each of which defines a grouping for one or more parameters associated with that object.

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56. (Original) Apparatus according to claim 55, wherein a parameter group defines a grouping with which one or more parameters are presented for any of editing and reporting.
57. (Original) Apparatus according to claim 56, wherein, as a consequence of descendancy, a descendant object is associated with the parameter groups of the ancestor object from which it descends.
58. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:

representing entities with objects, each of which represents an entity selected from the group of entities including a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object without recompilation of those objects.
59. (Original) A method according to claim 58, including the step of defining, during configuration, an association between an parameter and an object.
60. (Original) A method according to claim 59, including the step of defining, during configuration, an object as a descendant of another object.
61. (Original) A method according to claim 59, wherein each parameter has one or more attributes, and wherein the method includes the step of defining, during configuration, a value of an attribute.

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62. (Original) A method according to claim 58, wherein an object represents an entity within any of (i) the control system, (ii) a control level hierarchy, and (iii) the apparatus for configuring the control system.
63. (Original) A method according to claim 58, wherein each parameter has one or more attributes, and wherein the attributes of a parameter define any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.
64. (Original) A method according to claim 58, including the step of making effective as to a descendant object a change, during configuration, to a parameter of the ancestor object from which the descendant object descends, regardless of whether that change is made before or after the descendant is any of defined and created.
65. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:
- representing entities with objects, each entity including any of a block, block definition, modifier block, modifier block definition, block collection, composites block definition, I/O block, loop template, simple loop, and template-derived loop,
- each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,
- defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object),
- associating a descendant object with the parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object without recompilation of those objects.
66. (Original) A method according to claim 65, comprising the step of associating a descendant object with parameters in addition to those of the ancestor object from which it descends.

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67. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:

representing entities with objects, the entities including any of a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

associating each object with one or more parameters as a consequence of any of a parameter definition, parameter override and parameter modification contained or associated with the object,

each parameter pertaining to a characteristic of an entity represented by the object, wherein an entity models an entity within any of (i) the control system, (ii) a control level hierarchy, and (iii) the apparatus for configuring the control system

defining at least one object as a descendant of another object ("ancestor" object) such that change during configuration to a parameter of an ancestor object is effective as to a descendant object with which that parameter is associated without recompilation of those objects.

associating a descendant object with one or more parameters with which the ancestor object is associated, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object, except as to a parameter with which the descendant object is associated as a consequence of any of a parameter definition, parameter override and parameter modification.

68. (Original) A method according to claim 67, comprising the steps of

defining a second object as a descendant of a first object, and

defining a third object as a descendant of the second object.

69. (Original) A method according to claim 68, comprising the step of associating the second and third objects with one or more parameters of the first object, except as to a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification.

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70. (Original) A method accord to claim 68, associating the third object with a parameter associated with the second object as a consequence of any of a parameter definition, parameter override and parameter modification, regardless of whether a corresponding parameter is associated with the first object.

71. (Original) A method according to claim 67, comprising the steps of

defining at least one object ("modified" object) as being associated with another object ("modifier" object) for purposes of parameter modification,

associating a modified object with one or more parameters of the associated modifier object, and making effective as to that modified object a change, during configuration, to a parameter of that modifier object.

72. (Original) A method according to claim 71, wherein each parameter has one or more attributes defining any of the following with the respect to the characteristic to which the parameter pertains: name, grouping, display label, data type, behavior, help information, edit type, data value range, data value, formula definition, and display format.

73. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:

representing entities with objects, the entities including any of a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,

defining at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of that ancestor object without recompilation of those objects,

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associating at least one object with one or more parameter groups, each of which defines a grouping for one or more parameters associated with that object.

74. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:

representing entities with objects, the entities including any of a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop, and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of an entity represented by the object,

defining at least one object ("descendant" object) being defined as a descendant of another object ("ancestor" object),

associating a descendant object with one or more parameters of the ancestor object from which that descendant object descends,

changing, during configuration, a parameter of that ancestor object, the change being effective as to a descendant object with which that parameter is associated without recompilation of those objects,

associating at least one object with one or more parameter groups, each of which defines a grouping for one or more parameters associated with that object.

75. (Original) A method according to any of claims 73 and 74, comprising the step of presenting one or more parameters of an object during any of editing and reporting as a function of a parameter group associated with that object.

76. (Original) A method according to any of claims 73 and 74, comprising associating a descendant object with the ancestor object from which that descendant object descends.

Claim 77 (cancelled).

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78. (Currently Amended) A method for configuring a process control system, the method comprising the steps of:

representing entities with objects, the entities including any of a block, block definition, modifier block, modifier block definition, block collection, composite block definition, I/O block, loop template, simple loop , and template-derived loop,

each object being associated with one or more parameters, each parameter pertaining to a characteristic of the entity represented by the object,

defining at least one object ("descendant" object) as a descendant of another object ("ancestor" object)

associating a descendent object with one or more parameters of the ancestor object from which that descendant object descends, and making effective as to that descendant object a change, during configuration, to a parameter of the ancestor object,

configuring the process control system in accord with one or more of the objects without recompilation of those objects.

Claims 79 – 98 (cancelled).